

ANNUAL REPORT FOR 2008



R-2206B Mitigation Site
Lincoln County
TIP No. R-2206B



Prepared By:
Natural Environment Unit & Roadside Environmental Unit
North Carolina Department of Transportation
December 2008

TABLE OF CONTENTS

SUMMARY	1
1.0 INTRODUCTION	1
1.1 PROJECT DESCRIPTION.....	2
1.2 PURPOSE	2
1.3 PROJECT HISTORY	2
2.0 HYDROLOGY.....	4
2.1 SUCCESS CRITERIA.....	4
2.2 HYDROLOGIC DESCRIPTION	4
2.3 RESULTS OF HYDROLOGIC MONITORING	4
2.3.1 Site Data	4
2.3.2 Climatic Data.....	7
2.4 CONCLUSIONS	7
3.0 VEGETATION	9
3.1 SUCCESS CRITERIA.....	9
3.2 DESCRIPTION OF PLANTED AREAS.....	9
3.3 RESULTS OF VEGETATION MONITORING.....	9
3.4 CONCLUSIONS	9
4.0 OVERALL CONCLUSIONS/RECOMMENDATIONS.....	9

LIST OF FIGURES

Figure 1. Site Location Map	3
Figure 2. Monitoring Gauge Location Map	5
Figure 3. Hydrologic Monitoring Results.....	6
Figure 4. 30-70 Percentile Graph	8

LIST OF TABLES

Table 1. Hydrologic Monitoring Results.....	7
---	---

APPENDICES

APPENDIX A	GAUGE DATA GRAPHS
APPENDIX B	SITE PHOTOS AND PHOTO PLOT LOCATIONS

SUMMARY

The following report summarizes the monitoring activities that have occurred in the past year at the R-2206B mitigation site. The mitigation site is approximately 0.48 acre and construction was completed in June 2007. Monitoring activities in 2008 represent the first year of monitoring for the site. The site must demonstrate both hydrologic and vegetation success for a minimum of five years or until the site is deemed successful.

The mitigation site was previously maintained as a pond until a natural channel design was proposed at the site. The pond was drained and undercut with new soil material replacing the existing. However, due to existing springs in the area, the new material became too saturated for natural channel design. As an alternative, NCDOT restored a 0.48 acre wetland with the anticipation that stream flow will create its own path through the wetland. The channel that forms through the wetland will be evaluated periodically to determine if any in-stream grade control structures are needed.

The site is monitored with two groundwater gauges, one rain gauge, and visual vegetation monitoring.

The daily rainfall data depicted on the monitoring gauge graphs was recorded from an onsite rain gauge. An offsite rain gauge, maintained by the NC State Climate Office in Lincolnton, contributed to the daily rainfall data and historical rainfall data used for the 30th – 70th percentile analysis to determine if 2008 was a normal climatic year.

Hydrologic success criteria are based on the approved mitigation plan and require that the site demonstrate saturation or inundation within 12 inches of the soil surface for a consecutive 12.5% of the growing season during years of normal rainfall.

2008 represents the first year for hydrology monitoring. Both groundwater gauges located in the wetland restoration area exceeded the success criteria with saturation within 12" of the soil surface for 100% of the growing season.

The first year of visual monitoring of the site revealed the planted species are surviving in some of the planted areas and that the restoration area is re-attaining wetland jurisdictional status. A supplemental planting will take place in the winter of 2009.

NCDOT will continue to monitor the R-2206B Mitigation Site for hydrology and vegetation.

1.0 INTRODUCTION

1.1 Project Description

The R-2206B Mitigation Site serves as mitigation for TIP No. R-2206B, the NC 16 Bypass from north of NC 73 to north of SR 1386 (St. James Church road) in Lincoln County (Figure 1). The 0.48 acre site is located approximately 19 miles east of the Lincolnton.

1.2 Purpose

In order to demonstrate successful wetland mitigation, hydrologic and vegetation monitoring must be conducted for a minimum of five years or until the site is deemed successful. Hydrologic success criteria are based on the approved mitigation plan, which requires that the site demonstrate saturation or inundation within 12 inches of the soil surface for a consecutive 12.5% of the growing season during years of normal rainfall. Vegetation success will require reference photos, plant survival (noting missing, stressed, damaged or dead plantings), estimated causes and proposed/required remedial action) and visual inspection of channel stability. A monitoring report will be submitted within sixty days after completing the monitoring.

This report includes analyses of hydrologic and vegetation monitoring results, discussions of local climatic conditions throughout the growing season, and site photographs.

1.3 Project History

March 2008	Site Planted
September 2008	Visual Vegetation Monitoring (Year 1)
March-November 2008	Hydrologic Monitoring (Year 1)

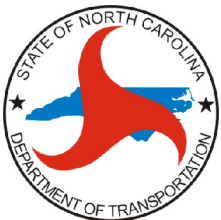
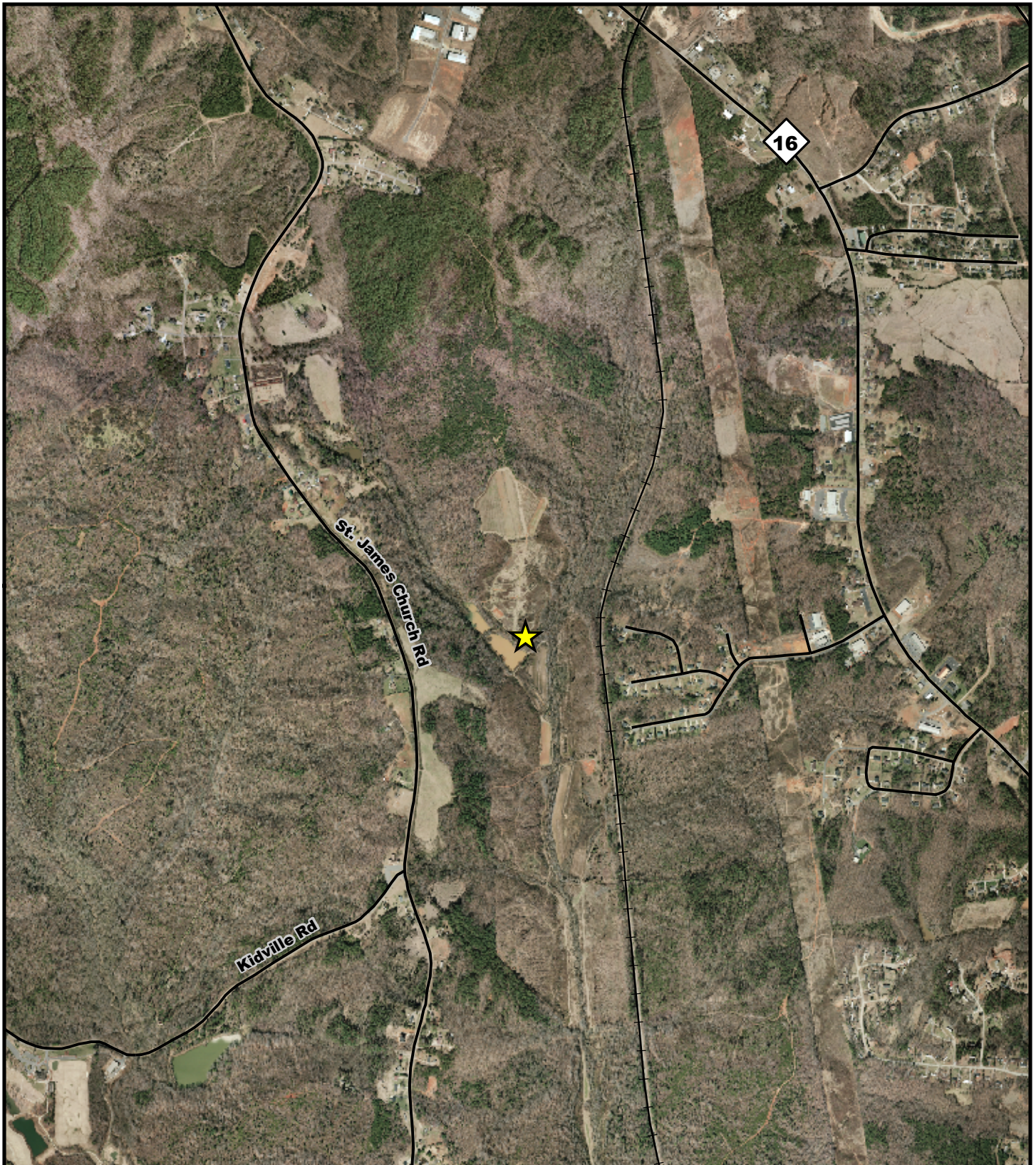


Figure 1. Site Location Map

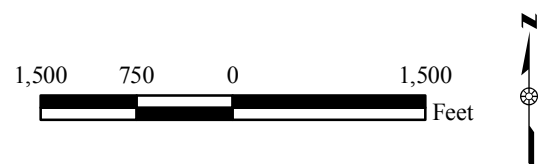


Image Source: Lincoln County Orthoimagery, 2005.

2.0 HYDROLOGY

2.1 Success Criteria

The hydrologic success criteria established for R-2206B Mitigation Site, as stipulated in the approved mitigation plan and subsequent revisions, require that the site demonstrate saturation or inundation within 12 inches of the soil surface for a consecutive 12.5% of the growing season during years of normal rainfall.

The growing season in Lincoln County begins on March 28 and ends November 4. These dates correspond to a 50% probability that temperatures will drop to 28°F or lower after March 28 or before November 4¹. The growing season is 222 days; therefore, hydrologic success requires 12.5% continuous saturation during this period, or at least 22 consecutive days.

2.2 Hydrologic Description

Two groundwater monitoring gauges were installed on the site (Figure 2) in February 2008 in the wetland restoration area. The groundwater gauges record water levels on a daily basis. A rain gauge is also located on the site to assist in comparison of the rainfall data from an official weather station in Lincolnton (supplied by the NC State Climate Office). Monitoring data for 2008 represents the first year of hydrologic monitoring for the site.

2.3 Results of Hydrologic Monitoring

2.3.1 Site Data

The maximum number of consecutive days that the groundwater was within twelve inches of the surface was determined for each gauge. This number was converted into a percentage of the 222-day growing season. The results are presented in Table 1. Figure 3 also provides a graphical representation of the hydrologic results. Gauges highlighted in blue indicate wetland hydrology for more than 12.5% of the growing season. Those gauges highlighted in black indicate no wetland hydrology (< 5% of the growing season).

Appendix A contains a plot of the groundwater depth for each monitoring gauge. The maximum number of consecutive days is noted on each graph.

¹ Soil Conservation Service, Soil Survey of Lincoln County, North Carolina.

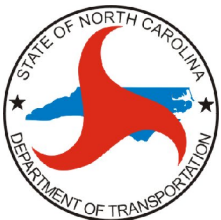
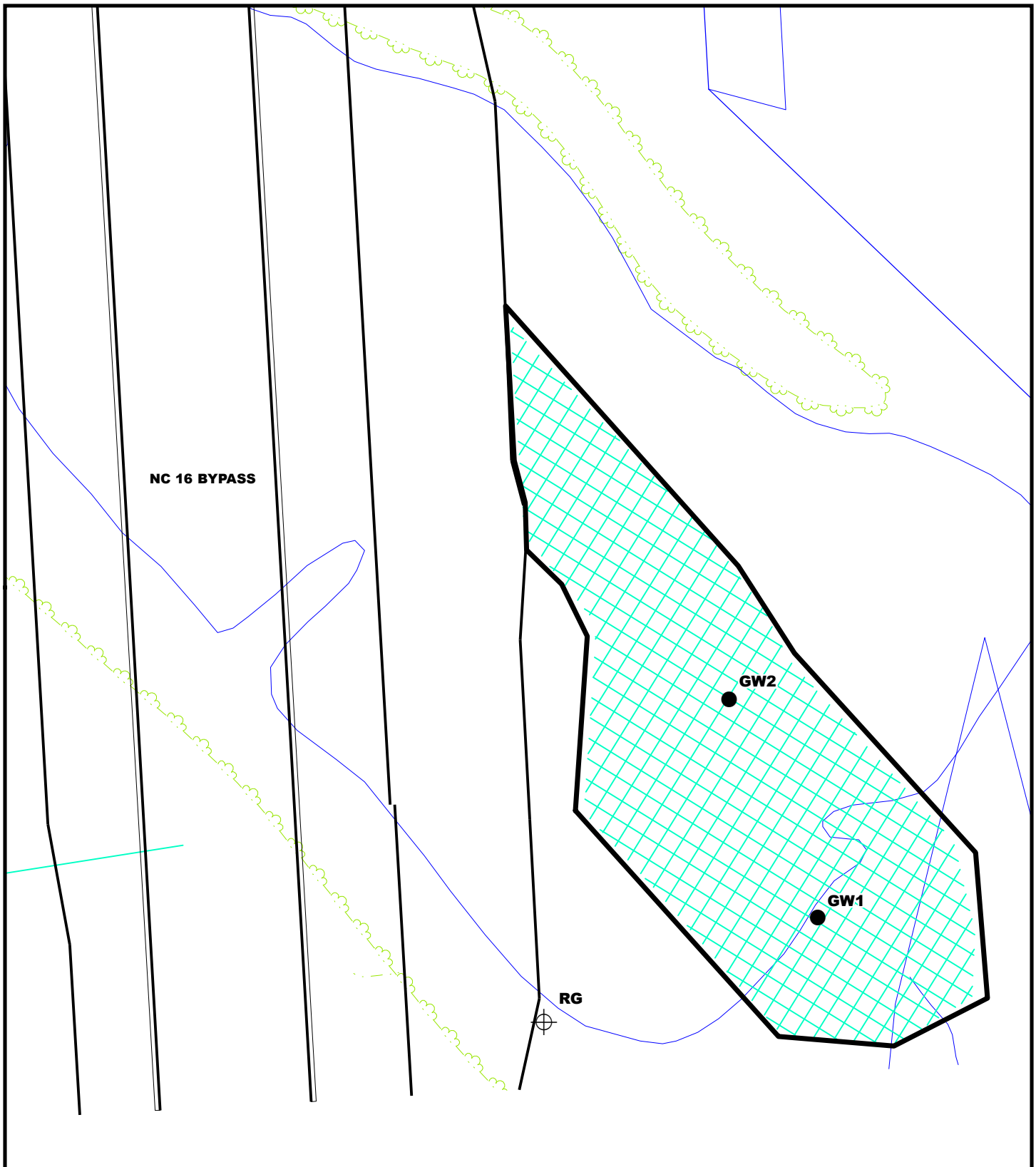


Figure 2. Gauge Location Map

- Groundwater Gauge
- ⊕ Rain Gauge



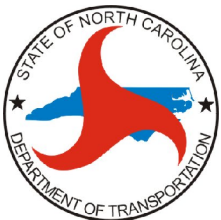
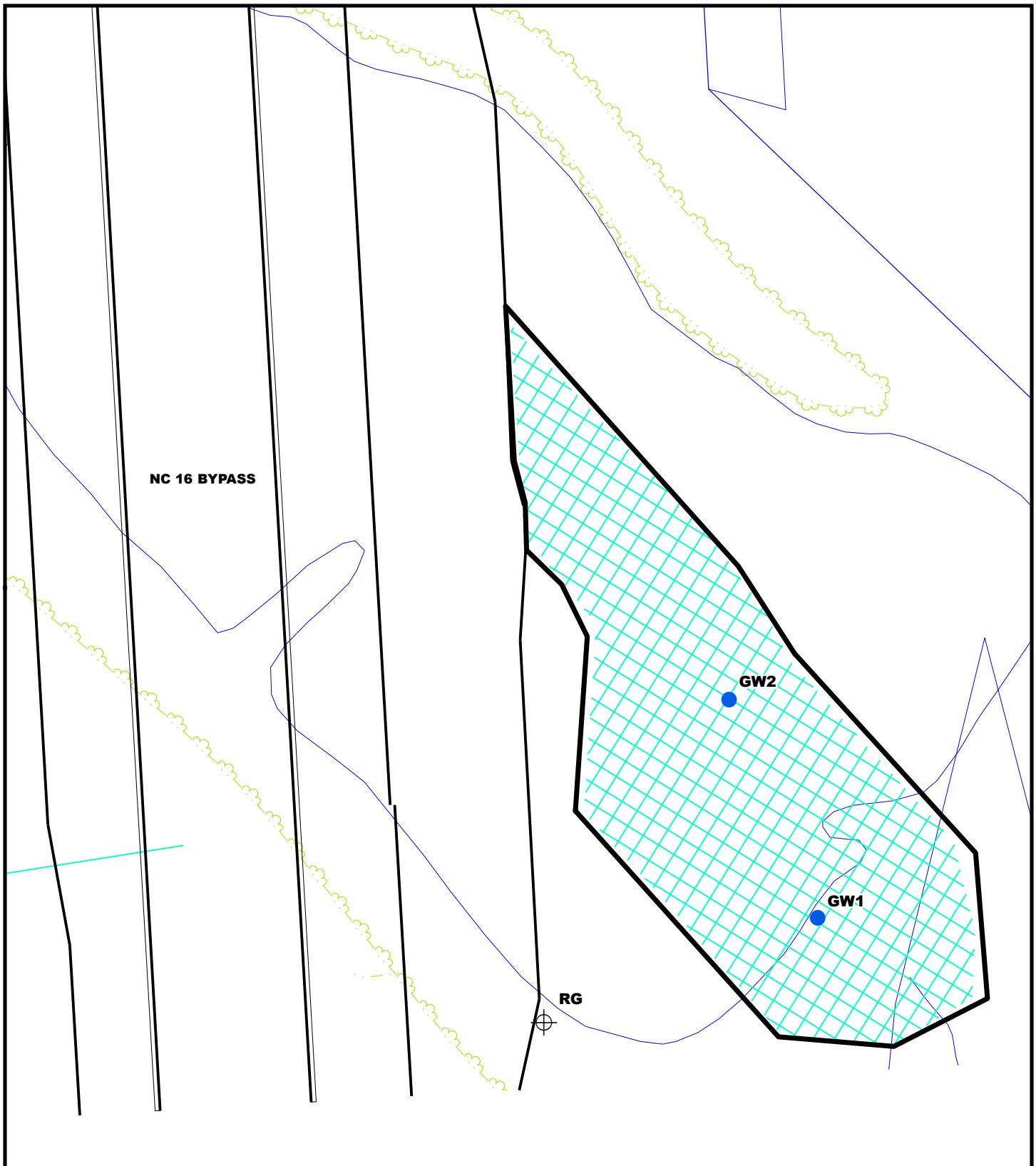


Figure 3. Hydrologic Monitoring Gauge Results

- 0 - < 5%
- 5 - 8%
- 8 - 12.5%
- > 12.5%

⊕ Rain Gauge

50 25 0 50
 Feet



Table 1. Hydrologic Monitoring Results

Monitoring Gauge	< 5%	5-8%	8-12%	> 12.5%	Actual %	Success Dates
GW-1+				X	100	March 23 - Nov 4
GW-2+				X	100	March 23 - Nov 4

+Gauge met success during average rainfall months (March, May, October, and November).

2.3.2 Climatic Data

Figure 4 is a comparison of the 2008 monthly rainfall to the historical precipitation (collected between 1977 and 2008) for Lincolnton, North Carolina. This comparison gives an indication of how 2008 relates to historical data in terms of climate conditions. The NC State Climate Office provided all of the historical rainfall information.

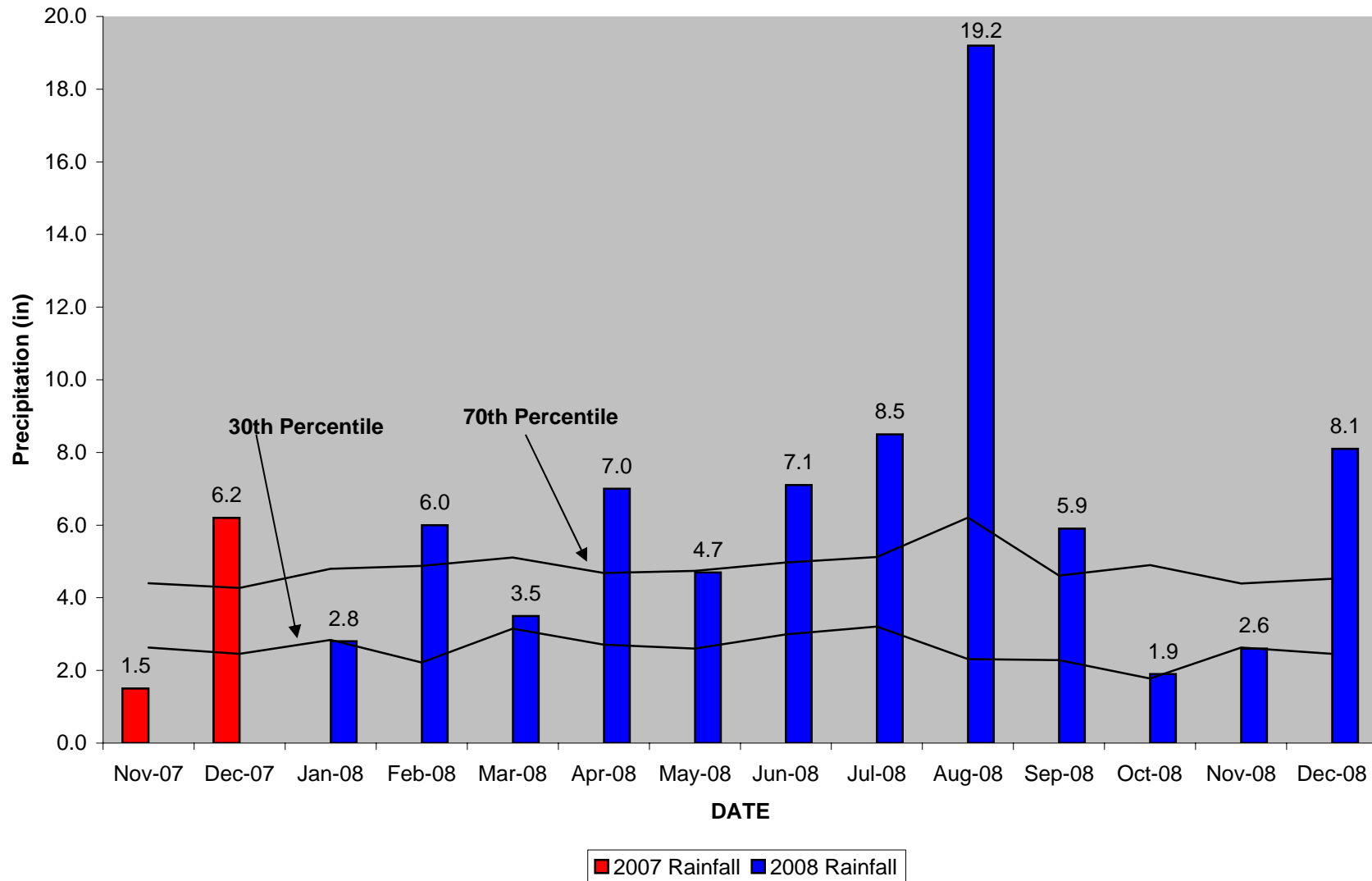
Based on the historical data, January, March, May, October, and November recorded average rainfall for the site in 2008. The months of February, April, June, July, August, September, and December recorded above average rainfall. Overall, the 2008 monitoring year was an average to above average rainfall year.

2.4 Conclusions

The 2008 monitoring year represents the first year of hydrologic monitoring for the R-2206B Mitigation Site. Both groundwater monitoring gauges recorded jurisdictional hydrology above the required 12.5% of the growing season.

NCDOT will continue to monitor the R-2206B Mitigation Site for hydrology.

**R-2206B Mitigation Site
Figure 4 (30-70 Percentile Graph)
Lincolnton, NC**



3.0 VEGETATION: R-2206B MITIGATION SITE (YEAR 1 MONITORING)

3.1 Success Criteria

Monitoring to support vegetation success will require reference photos, plant survival (noting missing, stressed, damaged or dead plantings), estimated causes and proposed/required remedial action) and visual inspection of channel stability. A monitoring report will be submitted within sixty days after completing the monitoring.

3.2 Description of Species

The following tree species were planted in the wetland restoration area:

Quercus lyrata, Overcup Oak

Platanus occidentalis, Sycamore

Fraxinus pennsylvanica, Green Ash

Betula nigra, River Birch

3.3 Results of Vegetation Monitoring

The planted species in the wetland restoration area is re-attaining wetland jurisdictional status and the planted species are surviving in some of the planted areas. Survival of the planted species is marginal. There are a number of planted species surviving, but several were also found dead. A supplemental planting will take place in the winter of 2009.

Site Notes: Other vegetation noted: *Scirpus sp.*, *Juncus sp.*, *Alnus sp.*, *Polygonum sp.*, *Typha sp.*, and various wetland grasses.

3.4 Conclusions

There were approximately 0.48 acres total of wetland restored on the site. There were no plots established on the site. By visual observation, the mitigation site revealed the planted species are surviving in some of the planted areas and that the restoration area is re-attaining wetland jurisdictional status. The stream flow in the wetland appears to be in the early stages of forming a stable channel. A supplemental planting will take place in the winter of 2009 to increase vegetation success.

4.0 OVERALL CONCLUSIONS/RECOMMENDATIONS

The 2008 monitoring year represents the first year of hydrologic monitoring for the R-2206B Mitigation Site. Both groundwater monitoring gauges recorded jurisdictional hydrology for 100% of the growing season. The vegetation monitoring revealed the planted species are surviving in some of the planted areas and that the restoration area is re-attaining wetland jurisdictional status. NCDOT will continue to monitor the R-2206B Mitigation Site for vegetation and hydrology.

APPENDIX A

GAUGE DATA GRAPHS

APPENDIX B

SITE PHOTOS AND PHOTO PLOT LOCATIONS

R-2206B Mitigation Site



Photo 1



Photo 2



Photo 3

